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WEU and Helios 2

REPORT

submitted on behalf of the Technological and Aerospace Committee
by Mr Lenzer, Rapporteur

ASSEMBLY OF WESTERN EUROPEAN UNION
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1. Adopted unanimously by the Committee.

2. *Members of the Committee:* Mr López Henares (Chairman); MM Lenzer, *Marshall* (Vice-Chairmen); Mrs Aguiar, MM Arata (Alternate: *Serra*), Mr Atkinson (Alternate: *Alexander*), Mrs Blunck, Mr Cherribi, Sir *John Cope*, MM Coviello, Curto, Mrs Durrieu, Mr Feldmann, Mrs Gelderblom-Lankhout, Mrs *Guirado*, MM Jeambrun, *Le Grand*, Litherland, *Lorenzi*, *Luis*, Magginas, Nania, Nothomb, Palacios, Probst, Sofoulis, Staes, Theis, *Valleix*.

Associate members: Mrs *Joergensen*, MM *Demiralp*, Kilic (Alternate: *Yurur*).

N.B. *The names of those taking part in the vote are printed in italics.*

Draft Recommendation

on WEU and Helios 2

The Assembly,

(i) Recalling its Recommendations 523, 555, 567, 570 and 576 on the development of a European space-based observation system and the future of the WEU Satellite Centre;

(ii) Taking note of the Madrid Declaration resulting from the meeting of the WEU Council of Ministers on 14 November 1995 and tasking the Space Group to define the conditions for WEU participation in a " developing multilateral European programme and to study questions related to a possible WEU ground segment, taking account of existing ground segments within WEU nations ".

(iii) Welcoming the agreement concluded between France and Germany in Baden-Baden in December 1995 concerning cooperation on two observation satellites, namely, Helios 2, a French infrared optical satellite and Horus, a German radar satellite;

(iv) Applauding the fact that the abovementioned agreement resulted in the signature on 15 December 1995 of protocols for the creation by Aerospatiale and Dasa of two joint subsidiaries, European Satellite Industries (ESI) and European Missile Systems (EMS);

(v) Welcoming the participation of Italy and Spain in the Helios 2 and Horus programmes, which now appears virtually certain;

(vi) Considering that civil and military programmes must not compete with but rather complement one another and achieve synergy, as was the case in the Helios 1 programme;

(vii) Taking into account the fact that the distinctive feature of the Helios 1 programme consists in the participating countries sharing the satellite's in-orbit operation and that this arrangement has been wholly successful;

(viii) Considering that this proves it is possible to share an observation system for defence purposes;

(ix) Noting that WEU participation in the Helios 2 and Horus programmes is not only desirable and necessary but is also feasible;

(x) Deeming it essential to meet the deadlines set for each of the programmes;

(xi) Recognising that while this implies ruling out any industrial role for WEU in the Helios 2 programme, its participation in the satellite's programming can be envisaged and that, in the case of the Horus programme, it would be possible for it to take part not only in an industrial but also in a programming capacity;

(xii) Aware that WEU's position must not be based on a mere aggregate of various national requirements but on an overall strategic vision;

(xiii) Considering that it would be appropriate if WEU were to indicate to those countries which have decided to participate in Helios 2 and Horus that it wishes to be involved in those programmes, and describe to them the arrangements for such participation, without necessarily having to wait for the said countries to make an offer;

(xiv) Considering that this approach requires firm political resolve on the part of the WEU countries;

(xv) Welcoming the decision conferring upon the WEU Satellite Centre the status of a permanent subsidiary body;

(xvi) Considering that the imminent arrival of the first Helios 1 products will mark the start of a new phase for the Satellite Centre;

(xvii) Noting that any WEU commitments regarding Helios 2 and Horus together with an increase in the operational capabilities of the Satellite Centre will require a series of measures to be taken in respect of the Centre;

(xviii) Recalling the recommendations adopted by the Assembly on the need to develop relations with the European Space Agency in order to benefit from its experience and structures in so far as they could serve WEU's objectives;

(xix) Regretting once again that, while the WEU Council has to observe the requisite discretion about space activities, it does not provide the Assembly with more detailed and more specific information which would help the Assembly obtain the necessary support of the general public,

RECOMMENDS THAT THE COUNCIL

1. Study arrangements for possible participation by WEU in the Helios 2 and Horus programmes, taking account of the following:

(a) owing to the advanced stage of the Helios 2 programme, it is inconceivable for WEU to play an industrial role in the programme;

(b) WEU participation in the programming of Helios 2 is both desirable and feasible;

(c) such participation in the satellite's programming must be based on WEU's strategic needs as an organisation and not on a mere aggregate of various national requirements;

(d) it is still possible for WEU to participate in the Horus programme in both an industrial and a programming capacity;

2. Present a proposal to the countries participating in the Helios 2 and Horus programmes without necessarily waiting for them to specify their proposal to WEU;

3. Involve the Planning Cell and Intelligence Section in the WEU study and subsequent proposals and make this an official arrangement so that in future the two bodies are permanently linked to the system's operation;

4. Make the procedure concerning task requests to the Satellite Centre more flexible and simple with a view to reducing the time it takes to complete;

5. Provide the Satellite Centre with its own receiving centre and a telecommunications link with Brussels;

6. Equip the Satellite Centre with a mobile imaging station enabling it to acquire and analyse images on the spot;

7. Develop synergies between civil and military research projects using common technologies;

8. Study a combination of the airborne and satellite solutions for monitoring the earth;

9. Communicate to the Assembly more detailed and more specific information about WEU's space activities which, while respecting the necessary confidentiality, enables the Assembly to associate the public with its work;

10. Develop relations with the European Space Agency in order to benefit from its experience and structures.

Explanatory Memorandum

(submitted by Mr Lenzer, Rapporteur)

I. Introduction

1. This report should be considered as the logical sequel and consequence of the work done by the Technological and Aerospace Committee, which has organised a number of colloquies and produced various reports over the last ten years in particular, with a view to Europe acquiring an autonomous space-based observation capability.

2. Some events that have taken place in recent years in or outside Europe support the view that the strategic need for a space-based observation system is becoming an increasingly pressing requirement.

3. On the one hand, the collapse of the Soviet empire has put Europe in a new situation in which the limited risks to its security have replaced the major threat of the past. On the other, various factors making for instability on the southern shores of the Mediterranean pose a danger for European security.

4. Furthermore, as was stated in the Treaty on European Union (TEU), European countries are having to take on ever greater responsibilities with a view not only to guaranteeing their immediate security but also to increasing stability throughout the world.

5. It is for this reason that the Petersberg Declaration, the second part of which deals with strengthening WEU's operational role, specifies in accordance with the Declaration by the WEU member states attached to the TEU, that " WEU member states have been examining and defining appropriate missions, structures and means covering, in particular, a WEU planning cell and military units answerable to WEU, in order to strengthen WEU's operational role ".

6. Thus, in addition to the provisions of Article V of the modified Brussels Treaty in relation to a common defence, military units answerable to WEU can carry out the following tasks acting under the authority of WEU:

- humanitarian and rescue tasks;
- peacekeeping tasks;
- tasks of combat forces in crisis management, including peace enforcement.

7. WEU's involvement in the Gulf war and the conflict in former Yugoslavia very clearly demonstrated the absolute necessity of obtaining information from space-based observation systems and proved that the lack of an autonomous space capability deprived European forces of the independence that was indispensable. If Europe had its own space-based observation facilities, they would constitute a capital asset for the establishment of a credible and effective security and defence system.

8. As well as monitoring crises that could affect European security to a greater or lesser degree, the purpose of a European space-based observation system would also be to verify disarmament treaties, control arms proliferation and, last but not least, monitor risks and threats to the environment.

9. For the purpose of expressing an opinion on this matter, the Committee has not only evaluated the political and military factors but has also assessed European technological and industrial capabilities and questions concerning the cost, development and use of a space-based system. In this context it has considered it important to ensure that the public at large is associated with the project from the outset.

10. Alongside other factors of equal importance, the financial aspect is the overriding consideration when it comes to making a choice. The cost of a European space-based observation system is extremely high and that is why the Committee has stressed that it is essential to inform the public in the various European countries of the objective need for such a system and of the advantages its development would have not only for European security but also for international stability. The Committee is firmly convinced that the support of Europe's citizens is fundamental for going ahead with the project.

11. In order to inform and convince the taxpayers, the WEU Assembly and national parliaments have a considerable task to accomplish in association with the government and the WEU Council which, while observing the discretion such matters usually require, should avoid excessive secrecy as this would do nothing to help secure the citizens' support that is essential.

12. The Committee is firmly convinced of this need and has stressed the point on many occasions in recent years [1].

1. See Recommendations 555, 567, 570 and 576

13. The last colloquy organised by the Technological and Aerospace Committee and entitled " A European space-based observation system " was held in March 1995 at San Agustin (Canary Islands) and provided the political, military, scientific and industrial communities with a unique opportunity to study all the problems posed by a project of this scope and discuss them. After the colloquy, the Committee produced Document 1454 [2] and the relevant recommendation (576). It was adopted by the Assembly at its June 1995 session and among other things invited the Council to:

> " seek agreement with the countries deciding to participate in the Helios and Osiris programmes for facilitating implementation of these programmes and associating other member countries, integrating them progressively into WEU's activities and, to this end, requesting participating countries to open up these programmes to their WEU partners;
>
> ... task the Space Group with studying the integration of these programmes into WEU's activities and invite the intelligence section of the Planning Cell, as soon as it is set up, to give its opinion on problems connected with the use of the system; ".

14. Furthermore, the first part of the WEU Council's 41st annual report to the Assembly (1 January – 30 June 1995) stated that the Space Group, supported by its " Organising " and " Technical " Working Groups, was continuing the necessary studies in preparation for a proposal for a decision on the possible implementation of a WEU satellite programme and a draft memorandum of understanding between member states.

15. The proposal for a decision was to be based on one of three possible options, previously defined as follows:

- the establishment of a WEU satellite system;
- participation in a multinational programme under development;
- purchase of images.

16. Moreover, the Madrid Declaration resulting from the meeting of the Council of Ministers held in that city on 14 November 1995 endorsed a decision tasking the Space Group to continue its activities by defining the basic conditions for possible WEU participation in a " developing multilateral European programme and to study questions related to a possible WEU ground segment, taking account of existing ground segments within WEU nations ".

17. A few weeks later, at the Franco-German summit held in Baden-Baden on 7 December 1995, President Chirac and Chancellor Kohl laid the basis for a cooperation agreement on two space programmes: Helios 2, a French infrared optical satellite, and Horus, a German radar satellite.

18. What now needs to be done is to study the experience the participating countries acquired in the development, execution and operation of the Helios 1 programme and the agreements they concluded with WEU for supplying it with Helios images. The second task is to decide what form the Organisation's future participation in Helios 2 should take. The following sections of this report concentrate on these issues.

II. Helios 1

19. On 2 February 1986, France took the decision to embark on the Helios programme. In September that same year an agreement was signed between the French Armed Forces General Staff, the DGA (the Délégation Générale pour l'Armement or national armaments procurement office) and CNES (Centre national d'études spatiales, the French space agency) regarding the joint development of Helios and Spot 4, on the basis of an identical platform. The French Armed Forces General Staff pilots the programme [3]. CNES has responsibility for the programme's overall architecture and is the contracting authority for the space component. The ground component comes under the direction of the DGA, which forms part of the executive agency with the Ministry of Defence and the Directorate of Missiles and Space [4].

20. Since the capital investment required for the Helios programme entailed too heavy a financial commitment for one country alone, France decided to open the programme to other partners. The result was the conclusion of a Helios cooperation agreement with Italy on 27 September 1987 and with Spain on 9 November 1988. This means that the executive agency now comprises a tripartite programme management structure.

21. The funding shares taken by France, Italy and Spain are 78.9%, 14.1% and 7% respectively, making France the undisputed leader. Under the agreement each cooperating country has the right to have images taken *pro rata* to financial participation, in accordance with the daily programming rules for the satellite which are jointly prepared and applied by the French, Spanish and Italian General Staffs and intelligence services.

22. Also, the agreement makes provision for an industrial return for each country. A group of firms from each of the three countries is involved

2. " Towards a European space-based observation system " – report submitted by Mr Valleix.

3. See Appendix I.

4. See Appendix II for the Helios 1 components.

in the programme under the prime contractorship of Matra-Marconi Space. Cooperation between the three countries is what makes Helios a symbol as it is the first European space programme geared to defence requirements.

23. On 27 April 1993, the Ministers of Defence of France and Spain, Mr François Léotard and Mr Julian Garcia Vargas, together with the Italian Ambassador to Spain, Mr Antonio Ciarrapico, and the Secretary-General of WEU, Mr Willem van Eekelen, signed a Memorandum of Understanding (MOU) in Madrid on the supply of Helios products to WEU by the three participating countries.

24. This MOU, signed the day before the official inauguration of the WEU Satellite Centre, authorises the WEU countries to receive Helios images, ready for analysis as soon as possible, including a range of collateral data.

25. There is every indication that the MOU also stipulates that WEU can have access to the special software required for image analysis on conditions that are similar to those that apply to France, Italy and Spain. On the basis of the information your Rapporteur received, the Satellite Centre must specify its objectives to the Helios countries. They should then supply the corresponding images for the Centre's exclusive use. As is only to be expected, classifying the Helios images is one of the problems of most concern to the three Helios countries, which have reserved the right to take the measures necessary to protect Helios products. Indeed, they are responsible for their classification and it is up to them to ensure that the Satellite Centre respects the classification they set. It would appear that the Torrejón Centre can obtain the necessary clearance for this purpose.

26. The Helios 1 programme consists of two satellites called Helios 1A and 1B; the second of these will be kept in storage and its launch date will depend on the performance of Helios 1A. The development and production of this first satellite started in 1989 and it was launched on an Ariane 4 launch vehicle on 7 July 1995 from the Kourou launch site. Construction work on the second satellite started in mid-1995 and is scheduled for completion by the end of this year.

27. Each satellite, weighing 2.5 tonnes, has a theoretical lifetime of some 4-5 years. It has a limited capability of daytime observation in good weather conditions and its resolution enables it to identify most items of military equipment. The satellite is in a sunsynchronous polar orbit at an altitude of 677 km[5] and it has a repeat flyover time of 24 hours, given its speed of roughly 7.8 km per second.

5. Air & Cosmos/Aviation international, No. 1527/28, 14 July 1995.

28. The satellite's orbit and manoeuvring capacities guarantee that a given location can be observed every day and that 15 or so scenes can be taken daily from orbits corresponding to priority interest zones such as Europe, Africa and the Middle East.

29. The satellite comprises a platform and a payload. The platform houses a power supply, an attitude and orbit control system and a satellite control system using encrypted telecommand links. The payload includes optical imaging instrumentation, a data-gathering system using digital magnetic tape recorders and a telemetry system for transmitting data to the ground stations. The satellite carries a very high resolution inframetric camera.

30. The programme also includes a receiving station and a data-processing centre in each of the three countries. More will be said on this later.

31. The total cost of the programme could be put at about ten billion francs, shared among the countries party to the agreement on the basis of the percentage rates already mentioned.

Synergy between civil and military activities

32. There is no doubt that missions carried out by military satellites have important repercussions in the civil sector, particularly when it comes to monitoring natural disasters and protecting civilian populations; also, as stated by Mr Fourré, Chairman of Eucosat[6], " in areas as wide-ranging as maritime transport, agriculture or poppy cultivation, space-based means can contribute to controlling illegal activities ".

33. It is for this reason that " military and civilian efforts must not compete with, but rather complement one another and look for synergies "[7]. These synergies should also be sought with a view both to reducing the high cost of space programmes and to using technologies already present in programmes that have been tried and tested and are technologically and operationally independent. To this end, civil and military technologies must accordingly be combined and existing technical and budget resources put to good use by seeking to secure as many common elements as possible, thereby enhancing programmes under way.

34. Military programmes can therefore use to their advantage the know-how acquired in equivalent civil programmes and vice versa: there is no doubt that the industrial repercussions of military programmes boost momentum in space research

6. Colloquy on " A European space-based observation system ", San Agustin, March 1995.

7. Mr Martinez-Garcia, Executive President of GMV (Spain). Colloquy on " A European space-based observation system ", San Agustin, March 1995.

and development work and in the space industry in general.

35. The Helios programme's use of components from the Spot civil satellite and of the Ariane launcher clearly shows that synergy can be achieved through cooperation between the civil and military sectors.

36. With reference to Ariane, Arthur Paecht, a member of the French National Assembly, has said that " the existence of a civil launcher that has proved its track record and cost-effectiveness on commercial markets in the civil sector is the only option and guarantee of the availability of a launcher than can be used to meet military requirements without restriction " [8]. This aptly describes Ariane, which is used to launch civil and military satellites alike.

37. The launchers in the Ariane series have been developed by the European Space Agency with the support of CNES and commercialised by the Arianespace company. Among others, European space firms such as Daimler-Benz, Aerospatiale and Matra-Marconi have participated in the construction of Ariane.

38. On 7 July 1995, when an Ariane 4 launcher put the Helios 1A satellite into orbit, Mr Charles Bigot, Chairman of Arianespace, expressed " the company's great pride in launching a European defence satellite for the first time ".

39. Spot is a commercial satellite for civilian use produced by the Spot-Image company. Helios uses a Spot 4 platform housing the payload, power supply, a thermal control system and a satellite control system using encrypted telecommand links. Spot and Helios have separate attitude and orbit control systems.

40. In addition, the two satellites are controlled by the station-keeping centre and also have the same magnetic tape recorders able to store several hundred images. Both have a very similar general architecture. Thus, Spot 4 and Helios 1 have 45% of parts that are common to the satellite and the station-keeping centre. This proportion of common parts has enabled the countries in the consortium to make savings of 1.3 billion francs. This approach will be repeated with Spot 5 and Helios 2 and will lead to savings estimated at about one billion francs.

The industrial issues

41. The cost of space-based systems, current international competition and the advent of new competitors, particularly in Asia, are some of the problems confronting Europe's space industry and even threatening its existence.

42. In a similar context, the Helios programme represents a challenge not only from the strategic but also the industrial viewpoint. Helios has given fresh impetus to firms having to contend with a decline in their turnover and a reduction in the number of big space programmes.

43. Moreover, the programme has helped bring about a series of changes in the European space industry in the form of mergers or takeovers, which improve the industrial and financial situation of the firms involved and enable them to put up a better performance vis-à-vis foreign competitors. One such example is the acquisition of British Aerospace Systems by Matra-Marconi Space and others are mentioned in the section of this report dealing with Helios 2.

44. Helios 1 has also provided a reason for the continued existence of smaller, specialised firms by increasing the demand for products from these sub-sectors and offering them access to new technologies.

45. Thirty or so French, Italian and Spanish firms have taken part in the development of the Helios 1 programme and of what is called the " ground segment ", that is, the ground-based facilities.

46. Matra-Marconi Space (MMS) is the programme's prime contractor both for the satellite and the ground segment. As far as the satellite is concerned, Aerospatiale was awarded the prime contractorship for the imaging system with Alenia, Casa, Reosc, Sextant, Sodern and others working with it in cooperation. Matra-Marconi Space was also given the prime contractorship for the vehicle equipment bay with the participation of Alcatel, Alenia and Enertec, and for the platform in association with Aerospatiale, Alcatel, Alenia, Laben, Sagem, SEP, Sextant and Sodern.

47. The following firms have worked in cooperation with MMS on the ground segment: Matra Cap Systèmes, Matra Défense, Alenia, Datamat, Telespazio, Vitrociset, Crisa, Inisel and others.

48. MMS, the foremost European space contractor with a turnover of 6 billion francs in 1994, is responsible for the integration of the satellite, including its platform and payload, the development of the platform, which is derived from that of Spot 4, and the development of the electrical ground systems.

49. With regard to its ground segment responsibilities, MMS works with Matra Cap Systèmes on the development of the operational software, integration of the Helios main centre software programs, and integration of the main centres and image receiving centres with one another [9].

8. " Une nouvelle donne pour l'espace militaire " by A. Paecht, Revue de l'Assemblée nationale, No. 1892

9. More details on the ground segment will be given further on

50. Aerospatiale, prime contractor for the imaging system, also supervises the definition, development and operation of the reference image simulation facilities for the programme together with the definition of some of the procedures for analysing quality control of images acquired in flight.

51. Finally, according to Mr Didier l'Eleu de la Simone [10]: " the development of the Helios satellites has necessitated the use of the most advanced technologies in order to meet the requisite specifications. The space firms involved in this programme have demonstrated their ability to meet the technological challenge and have enabled France, Italy and Spain to gain entry to the very select club of countries with access to information gathered in space ".

III. Helios 2

Lessons to be learnt from the Helios 1 experience

52. The novelty and success of the Helios 1 programme are not due solely to the fact that three European countries, France, Italy and Spain, agreed to cooperate on the first European space programme for defence purposes, or because some thirty firms from those countries worked together closely on the development of the two satellites and the ground facilities. What really differentiates Helios 1 from other programmes carried out in cooperation and makes the venture particularly distinctive is the fact that the participating countries also share the in-orbit operation of the satellite.

53. Normally speaking, cooperation programmes are confined to sharing the development and production of a given item of equipment, with each participating country reserving the right to use it subsequently for its own needs.

54. In the words of the Chief Armaments Engineer, Mr Rabault [11], Director of Missiles and Space at the French national armaments procurement office (DGA), the Helios programme " is an entirely new departure for a security and defence system and for our defence headquarters and services that are the users of such systems ".

55. Speaking about Helios 1 at the Eucosat colloquy already mentioned, Colonel Molard said there were five lessons to be learnt from the programme: first, it showed it is possible to share an observation system for defence purposes in the particularly sensitive field of intelligence, on the basis of a meticulous mutual learning process and reciprocal trust. It is also possible to extend the system of sharing to four countries but enlarging it to take in five or more " would not make sense because of the extremely low productivity that would result "; however, Colonel Molard added that " only an organisation such as WEU, programming the system to be chosen, as a priority on behalf of a European community, could manage such a system ".

56. The second lesson concerns the excellent cost-effectiveness obtained not only through cooperation and synergy with Spot 4 but also because space-based observation has been seen to be a real way of multiplying assets.

57. The third point is that the composition of the programme in terms of the participating countries is appropriate and its distinctiveness is based on three factors: it is small, has an open-minded approach to civilian know-how and is operational.

58. The fourth point concerns the principle of a fair industrial return, and its application to each of the programmes taken individually should, in Colonel Molard's opinion, be studied to evaluate its undoubted merits but also its limits.

59. Finally, a pragmatic approach is essential. As Colonel Molard puts it: " it is preferable to develop a first object, even a modest one, rather than persist with a dream of an ambitious system with a multitude of sensors, missions, and users that cannot be realised in the short term ".

Why build a second Helios?

60. There are two main objectives behind the decision to build Helios 2, a second optical observation satellite for military purposes, the first being the need for a satellite to take over from the first generation and the second being an improvement in the programme from the technological viewpoint.

61. Three principles were therefore taken into account from the programme's outset: building on experience and systems and adapting them as appropriate, integrating new technologies and improving the programme through the incorporation of infrared components that will make observation by night possible and will consequently enable more information to be gathered.

62. As a result of experience gained from Helios 1 and the lessons learnt from the programme, the development and operation of Helios 2 should make it possible to cut the time required for collecting images by a half or a third, obtain an increased detection capability (simultaneous scenes and a higher resolution), and accommodate the idea of synergy between the civil and military sectors (Spot 5 and Helios 2), this being an area with scope for savings of the order of a billion francs.

10. Military adviser at MMS. " Air Actualités ", No. 480, March 1995.

11. Colloquy on " A European space-based observation system ", San Agustin, March 1995.

Agreements between France and Germany – participation of Italy and Spain

63. The Franco-German Security Council, consisting of the President of the French Republic and the German Chancellor together with the foreign and defence ministers and the chiefs of staff of both countries, was set up in 1982. A committee comprising the French and German foreign policy directors and chiefs of staff produces a six-monthly report establishing the issues that are submitted to the Council for examination and decision.

64. In addition, three working groups were created on strategy and disarmament, military cooperation and armaments cooperation, as well as a series of standing and ad hoc sub-groups.

65. A large proportion of the work done at the most recent Franco-German summit, held in Baden-Baden on 7 December 1995, was devoted to security and defence problems. It was showed that cooperation between the armed forces of the two countries is proceeding most satisfactorily, as is cooperation on armaments. France and Germany decided to set up their own armaments structure taking account of the fact that at their meeting in October 1995, the WEAG National Armaments Directors did not in fact take the planned decision to create the European Armaments Agency and did not give their views on the setting-up of a Franco-German armaments agency.

66. The most widely expected, and equally the most important, decision taken at the summit was no doubt the decision on Franco-German cooperation on observation satellites. The ad hoc interministerial group on observation satellites had in fact submitted its findings on this subject in June 1995 and Germany had still not taken a final decision, mainly because of the need to find the necessary funding [12] but also because of pressure from the United States which was offering Germany access on very favourable conditions to information gathered in space by a Lockheed Martin satellite.

67. In the end, Germany made the right choice and went for the European solution by responding positively to the proposal from France, which had done its utmost to persuade Germany to join the programme for political, military, economic and industrial reasons.

68. The Franco-German agreement covers cooperation on the Helios 2 programme and the German Horus radar satellite project given that they are complementary. The practical details of the agreement are still being negotiated at the time of writing and your Rapporteur will come back to them further on.

69. In the view of the French Defence Minister, Mr Millon, the agreement's significance is threefold: " political, because it fits in with the vision of European construction that France and Germany share " ... " military, because it anticipates closer operational cooperation in a strategic area " and finally " industrial, because it opens the door to the formation of a European group able to compete worldwide ".

70. The first consequence of the agreement was the signature on 15 December 1995 of the protocols for the creation by Aerospatiale and Dasa of two joint subsidiaries, European Satellite Industries (ESI) and European Missile Systems (EMS).

71. The ESI holding company (in which Aerospatiale and Dasa each have a 50% share) will be located in Munich and managed by a German national. It will have two subsidiaries: ESI Deutschland, based in Friedrichshafen, and ESI France, based in Cannes. This will make ESI the leading European satellite company and as such it will participate in the Helios 2 programme and the Horus project.

72. Even though Helios 2 is no more than the logical follow-on to Helios 1, there will be some industrial changes due to Germany joining the programme. Matra-Marconi Space will remain the prime contractor for the programme while Daimler Benz Aerospace will be prime contractor for the Horus radar observation satellite, mainly because of the expertise it has acquired with the European Space Agency's ERS-1 and ERS-2 remote-sensing satellites.

73. The Helios 2 and Horus programmes immediately had major repercussions in that they brought about Franco-German rapprochement in the space field, a decisive move for the future of European military space activities, and also created the conditions for setting up two ESI subsidiaries which, in the words of the Chief Executive of Aerospatiale, Mr Louis Gallois, " constitute a major step forward for structuring the European space and defence industry and will provide Europe with the means it needs to improve its competitiveness on fiercely competitive world markets " [13].

74. Italy and Spain had made their participation in the Helios 2 programme contingent upon Germany's response. Once Germany had decided to join the programme, a first meeting of the four countries was held in Rome on 17 January 1996. Its results and the ensuing negotiations, which are still going on, give grounds for thinking that the four countries' contributions to the Helios 2 and Horus programmes could be as follows:

– Germany would contribute 20% of Helios 2 funding and 10% of the work

12. Air & Cosmos, 15 December 1995.

13. Air & Cosmos, No. 1545-46, 22 December 1995.

given that the programme is already at an advanced stage [14]. Germany's contribution to Horus funding could be as high as 60%;

- France would contribute 60% of Helios 2 funding and between 15% and 20% of Horus funding;
- Italy's funding share would be 7% for Helios and 20% for Horus. While Italy's commitment is almost firm, this does not seem to be the case for Spain, which maintains its declaration of intent pending a final decision by the new government. Spain envisages a 3% contribution to each of the programmes.

75. It does not seem that any other country has been contacted to take part in the Helios 2 or the Horus programme. In reply to a parliamentary question from Lord Kennet as to whether the United Kingdom had expressed a desire to participate in Helios 2 and whether its commitments to the United States ruled out any such participation, the British Government said it had not made such an approach but that in any event its commitments to the United States would not preclude that possibility and that the United Kingdom could take part in the programme through WEU. According to certain unofficial calculations, the participation of a fifth partner could put the programme's cost up by about 12% mainly owing to industrial returns.

IV. The ground facilities

76. The Helios 1 programme consists of a space segment – the Helios space component – which comprises the satellite and the station-keeping centre, and a ground segment – the user ground component – which consists of a Helios main centre and an image receiving centre in each of the three participating countries [15].

77. The main duties of the station-keeping centre are to operate and monitor the satellite on a daily basis. For this purpose the centre is equipped with two control rooms:

- the satellite control centre, which provides an on-line link with the satellite and carries out programmed operations when the satellite flies over the telecommand stations located at Aussaguel, near Toulouse, in Kourou (French Guiana), on the Kerguelen Islands and at Hartebeesthoek (South Africa);
- the utilities management centre, which manages the satellites and their payloads off line; it prepares the operations, in particular the satellite programming messages that are drawn up on the basis of the work schedules received from the user ground component.

In essence, the station-keeping centre's role is to " listen, control, monitor, intervene and manoeuvre " [16].

The ground segment for the Helios programme

78. The user ground component primarily consists of the French Helios main centre, which is the nub of the system. It is located at Creil and centralises image requests from the authorities in France, Italy and Spain so as to relay them to the station-keeping centre for the purpose of drawing up the satellite's daily work schedule.

79. The French Helios main centre has a staff of 200 officers and NCOs taken from France's three services who are responsible for operations, programming and analysis. It also has a contingent of 10 Italian and Spanish officers and NCOs who are responsible for the international task-sharing aspect.

80. Each day, the three Helios main centres – at Creil (France), Pratica di Mare (Italy) and Torrejón (Spain) – prepare the daily satellite programme on the basis of national priorities and send the programming data to the French Helios main centre where the tripartite work schedule is drawn up. Each country therefore chooses its objectives, states its requirements and lists its priorities on the basis of urgency and importance. Creil is the forum for the " daily tripartite dialogue with a view to optimising the work schedule " [17].

81. Once it has been decided, the programming schedule for the following day, which takes account of each country's priorities and of satellite utilisation time, is sent in coded form to the station-keeping centre, which uploads it to the satellite. The satellite then takes the relevant images and delivers them in real time or in slightly deferred time when it flies within the visible range of the image receiving centres at Colmar, Lecce and Maspalomas. Thus each of the three countries receives its images in the form of telemetry data on its own national antenna for onward transmission to its main centre where they are analysed.

82. This then is how the system actually operates and it has demonstrated its feasibility in the complex field of information-sharing.

14. It should be remembered that the definition phase of the programme started in April 1994 and that a year later, April 1995 saw the start of the development and production phase for the first satellite in the programme, Helios 2A, which is due to be completed by 2001.

15. See Appendix II.

16. Air Actualités, No. 480, March 1995.

17. Colonel Molard, Armed Forces General Staff, Space Office. Eucosat colloquy, Bonn, 20-21 September 1995.

The WEU Satellite Centre

83. The WEU Council of Ministers, meeting in Vianden in June 1991, decided to create a satellite image interpretation centre whose task, in the first instance, was to consist in training European experts to interpret photographic images taken by satellites. It was also to include the job of processing the data and making it available to the member states, in particular for the verification of disarmament treaties, crisis monitoring and environmental monitoring.

84. A few months later, in November 1991, the Council of Ministers agreed to locate the centre at the Torrejón air base in Spain. The Centre was officially inaugurated on 28 April 1993 and the event was considered by all the participants to be a historic occasion given that it was WEU's first tangible achievement in the building of a European security and defence architecture.

85. After a provisional three-year phase during which the Centre was directed by a British national, Mr Barry Blaydes, whose efforts and devotion deserve recognition, the WEU Council of Ministers, meeting in Madrid in November 1995, altered the Centre's status making it a permanent subsidiary body of WEU under Article VIII.2 of the modified Brussels Treaty. Since the beginning of 1996, the Centre has been directed by Colonel Bernard Molard of the French Air Force, who until then had been in charge of the Helios programme.

86. The Centre has a Steering Committee consisting of a representative from each of the member and associate member countries. The Committee's role is currently carried out by the WEU Space Group, which reports to the Council. The Space Group is itself subdivided into two working groups, the " Organising " Working Group, responsible for management and general organisation, and the " Technical " Working Group whose task consists in drawing up system specifications and selecting options with a view to the feasibility study management team's final report on the development of a European space-based observation system.

87. These groups meet frequently and at regular intervals and their work is extremely useful in that they seek consensus at the lowest level. In fact, in accordance with the decision taken in Madrid in November 1995, they endeavour to define the basic conditions for possible WEU participation in the Helios programme, including its ground segment. Their work includes a study of what is called the second option (participation in Helios) and is also intended to pave the way for WEU to be prepared for a possible proposal from the Helios countries.

88. The Satellite Centre and its operations have already been described in Document 1437, the report by Mr López Henares on " The future of the WEU Satellite Centre in Torrejón ". For this reason, your Rapporteur has confined himself to providing only the new information available about the Centre.

89. The sources used by the Centre are commercial satellites – Spot (France), ERS-1 (European Space Agency), Landsat (United States), Radarsat (Canada) – images from Russia and airborne images supplied by official sources in the member states.

90. Besides these images, which – as has already been said – are available on a commercial basis, the Memorandum of Understanding signed on 27 April 1993 makes provision for the Centre to receive images taken by the Helios satellite. Indeed, the first such images arrived at the Centre on 3 May 1996 and interpretation work on them is already being done on the basis of the Sarajevo task requested by the Planning Cell.

91. According to information supplied by the Centre, it had carried out the following tasks as at 1 May 1996:

Treaty verification

• support for CFE and OSCE inspection visits	8
• support for Open Skies missions	2
• infrastructure change	3
• non-proliferation treaties	0
Total	*13*

Crisis monitoring

• preparation for humanitarian aid	12
• support in preventing non-compliance with sanctions	1
• detection of military movements	13
Total	*26*

Environmental monitoring

• natural risks	1
• monitoring of nature of terrain	4
• monitoring of illicit movements	1
Total	*6*

92. In accordance with the decision of the WEU Council, the Organisation is the Centre's prime user and its member and associate members are also entitled to use it. The Centre's annual budget, which comes to 11 million ecus for the current year, covers staff remuneration and the purchase of images. When establishing priorities among countries' requests, the User Committee takes account of their financial contributions to the Centre.

93. When member and associate member countries request a specific task from the Centre, they are not required to provide additional funds. Once the Centre receives a task request, it draws up an analysis report on the basis of which the

Centre and user agree on the details of the task and in particular on the collateral data to be supplied. Once agreement has been reached, the WEU Council is informed of the task request.

94. In the following stage, and according to information from the Centre itself, it proceeds to purchase the relevant images and interpret them. Copies of the dossiers thus acquired are sent to all member and associate member countries.

95. Staff recruitment, which has given rise to some difficulties because of the obligation to maintain a certain geographical balance between the various posts, has now ended, which means the Centre will be fully operational by the middle of the current year, particularly as regards Helios. There is every indication that the problems posed by Helios-specific software and the need for the Centre to obtain clearance in order to handle any classified information it receives in the form of encrypted data have now been satisfactorily resolved.

V. Some thoughts and conclusions

96. Experience acquired with Helios 1 has shown that it is possible to share a military space-based observation system, that by applying synergy with Spot the cost-effectiveness ratio is wholly satisfactory, and that the organisation required for the system's development and exploitation is small, flexible and operational. On the matter of synergy between the civil and military sectors, your Rapporteur would stress an idea already put forward in the Committee's earlier reports, namely, that of establishing official and regular contacts with the European Space Agency with a view to having recourse to the Agency's experience and structures in so far as they could serve WEU's objectives[18].

97. WEU's participation in the Helios 2 programme is therefore not only desirable and necessary – it must also be feasible. First, it should be said that the deadlines set in the Helios 2 timetable must be met at all costs. To this end, our Organisation needs to act swiftly and resolutely and should demonstrate its firm political resolve to participate in the programme, keeping to the deadlines.

98. WEU should not expect to receive an offer from the Helios 2 participating countries but should express its desire to take part in the programme. Its involvement could not be industrial, mainly because the imperative need to keep to the fixed deadlines would make this impossible and also because the resulting increase in the programme's costs would far outweigh any benefits accruing from the financial contribution of a fifth partner. It would be advisable for WEU to put forward a proposal based on its operational requirements. It goes without saying that such a proposal must include both the Helios 2 and Horus programmes.

99. The purpose of a financial contribution from WEU would therefore be to secure direct involvement in the satellite's programming.

100. The Helios 2 participating countries should be fully prepared to accept WEU's participation and discount any other option they may have envisaged, such as that of WEU purely and simply improving the operational capabilities of the Satellite Centre or purchasing and operating its own satellite.

101. There is no doubt that the current arrangement agreed between the Helios participating countries and WEU is a good start but it will be totally inadequate to meet the Organisation's needs in the future; thus, the best way for WEU to improve the situation would be for it to participate in the satellite's programming on an equal footing with the other partners.

102. Under no circumstances should WEU's proposal be confined to an aggregate of various national requirements. Instead, it should be the amalgamation of a shared strategic vision. It will have to be compatible with the requirements of the Helios 2 countries and complement them, which is perfectly feasible.

103. WEU should take the necessary steps to secure the Planning Cell and Intelligence Section's effective and permanent involvement in space matters. This concerns not only the preparation of an offer to the Helios 2 partner countries but also includes the system's programming and operating aspects as a whole. It would also be appropriate to take similar action in respect of the Satellite Centre, a point the Assembly has stressed on several occasions without having received a precise and convincing response from the Council.

104. It is not really possible for the time being to provide any further details on this subject, mainly because the current Helios 2 partners have supplied only scant information. This is probably due to the fact that they are still engaged in negotiations.

105. The radar satellite programme is linked to Helios 2 because, as has already been said, the two programmes are complementary. Negotiations between WEU and the partner countries should therefore embrace both programmes. As the Horus programme is at a less advanced stage, it would still be possible to envisage industrial participation by the WEU countries.

18. Mr Luton, Director General of ESA, expressed a willingness for collaboration in his address to the Eucosat colloquy held in Bonn in September 1995

106. As far as the Satellite Centre is concerned, once solutions have been found to the problems relating to the software needed for Helios 1, the classification of Helios products, the protection thereof and of auxiliary information, the next step must be to make the procedure followed so far more flexible in order to simplify procedures and thereby reduce the time they take to complete.

107. In addition, it should be stressed that the images continue to reach the Centre by post and that WEU's involvement in the Helios 1 and 2 programmes will require the Centre to have its own receiving antenna and a telecommunications link with Brussels.

108. Furthermore, the Centre should be equipped with a mobile satellite receiving station along the lines of the Eagle Vision concept presented by Mr Cothier, Director General of Matra Cap Systèmes, in his address to the colloquy the Technological and Aerospace Committee organised in San Agustin in March 1995. Eagle Vision consists of a transportable imaging station that can be used for on-the-spot image acquisition and analysis anywhere in the world. The system mainly uses existing software, designed for the Spot programme with CNES. The number of items that required specific development is minimal and the system architecture uses standard hardware.

109. The programme was funded by the Pentagon through the foreign comparative tests channel. It was developed and delivered to the United States Air Force in 1994 by Matra Cap Systèmes. The system offers exceptional possibilities for supplying images necessary to a commander in the theatre. Such a mobile station, which can be made available very quickly, would be the direct responsibility of the Planning Cell and would be of considerable use (for instance, in monitoring the Dayton Accords).

110. Finally, for the purpose of monitoring the surface of the globe, your Rapporteur wishes to underline the importance of combining airborne and satellite options. The airborne option would make it possible to study other sources of images, data and all such information, thus complementing the satellite option. This view was expressed on several occasions by the former Director of the Satellite Centre, Mr Blaydes.

111. A satellite is not in fact a platform that is suitable for permanent observation and it could be said that its value lies in the strategic field and in its use for the creation of documentary databases.

112. If the main requirements are permanent observation, the creation of very high imaging resolution in order to identify medium-sized objects, and observation of the same zone using a number of different sensors, an airborne platform flying at high altitude is the most appropriate vehicle. For a platform flying at 15 km altitude, the radioelectric horizon is at a distance of 400 km and the zone that is observable without too many masks can extend to up 200 km, providing permanent observation of the order of 20 hours. The onboard sensors can serve a wide range of purposes such as radar imaging providing a resolution of a few metres, mobile echo radar sensing and tracking, detecting and pinpointing radioelectric transmitters, listening to communications on a Herzian wave medium and, possibly, taking images with a long-range oblique viewing camera. In addition to the sensors, the platform can accommodate systems providing permanent communications at a very high flow rate.

113. Some of the solutions developed to date are described below:

- The United States JSTARS system is based on a vertical integration of the detection, analysis and monitoring functions on board a single airborne platform. It is the result of the need to be able to project an autonomous system for the surveillance and conduct of operations over a long distance in the hypothesis that long-distance high flow-rate communications are not possible. However, it should be noted that this " autonomous " system must be combined with an AWACS and its escorts.

- The sound basis underlying the United Kingdom's ASTOR system is that, as a priority, an airborne platform must accommodate sensors so that their performance is not hindered by the horizon and that analysis and monitoring systems are more efficient if they are in the right position at the right time. However, the platform's small size does not allow for simultaneous use of the various complementary sensors which would be useful.

- While the French MOSTA-type solution does not exclude the possibility of projecting a genuinely autonomous system for the surveillance and conduct of operations, it is above all a platform that can very effectively accommodate various monitoring sensors whose complementarity means that precise information about the tactical situation in the zone under observation can be obtained on line; in its basic configuration, the analysis station is therefore located on the surface (on the ground or on a ship).

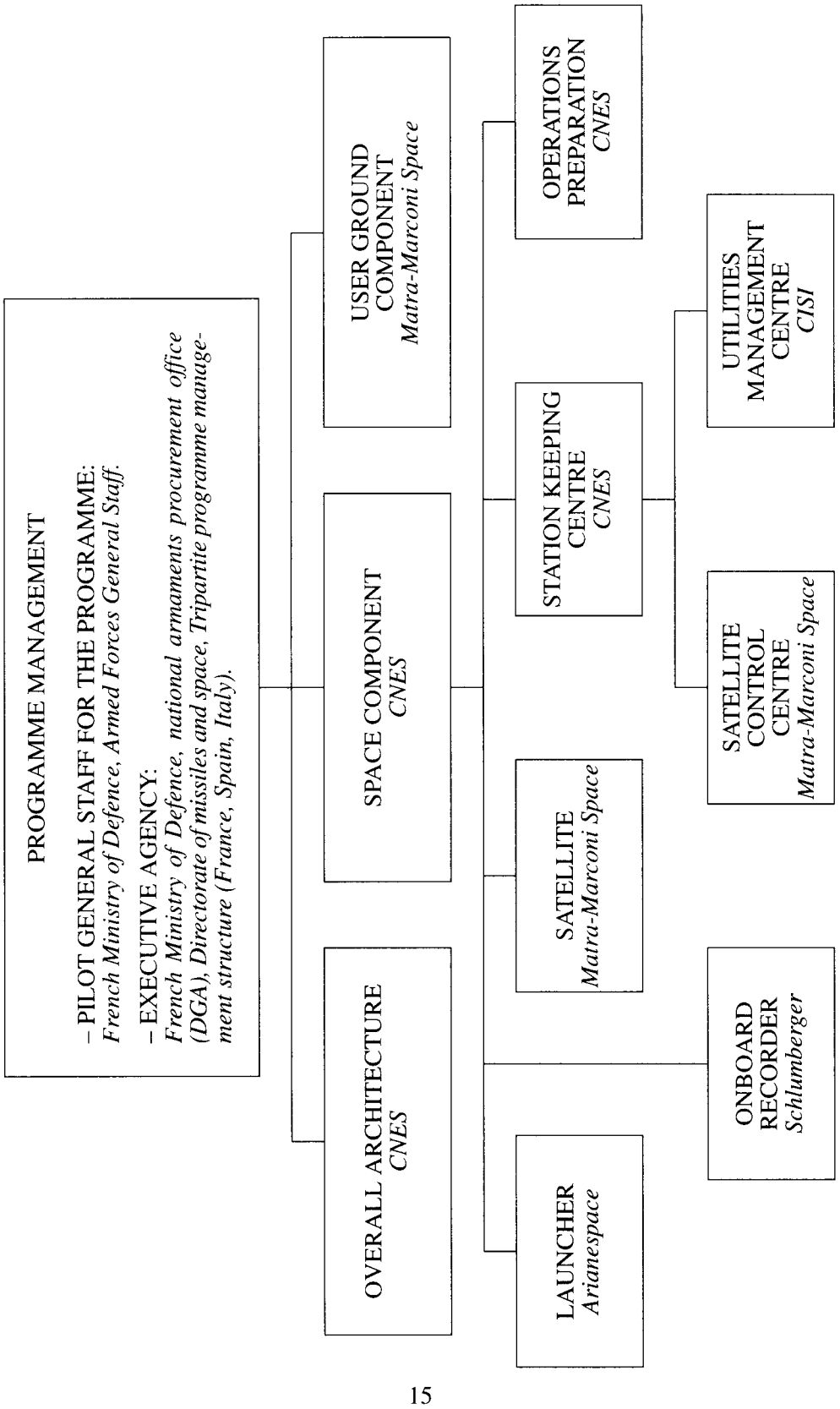
114. This type of airborne system constitutes the tactical Earth observation system which Europe needs. It could for example be used to monitor implementation of the Dayton Accords in Bosnia and Herzegovina and support the European implementation force.

115. In view of the importance of the issues involved, your Rapporteur believes it would be appropriate for the Committee to produce a report in the near future on monitoring the Earth using airborne means. Such a report would study requirements and existing solutions and would make the appropriate recommendations to the WEU Council.

116. Finally, in the Birmingham Declaration issued by the WEU Council of Ministers at its meeting on 7 May 1996, the ministers welcomed the continuing progress in developing the Satellite Centre's effectiveness and the beginning of the supply of Helios imagery to the Centre; they noted " with interest " the decision taken by France and Germany jointly to develop an earth observation satellite system. The ministers also noted that work is continuing on defining the conditions for " possible WEU participation in a developing multilateral European programme " and looked forward to a " progress report ". In the absence of genuine political will regarding this most fundamental aspect of European security and defence, it would appear that the Council of Ministers was not prepared to take a decisive and responsible initiative on the issue.

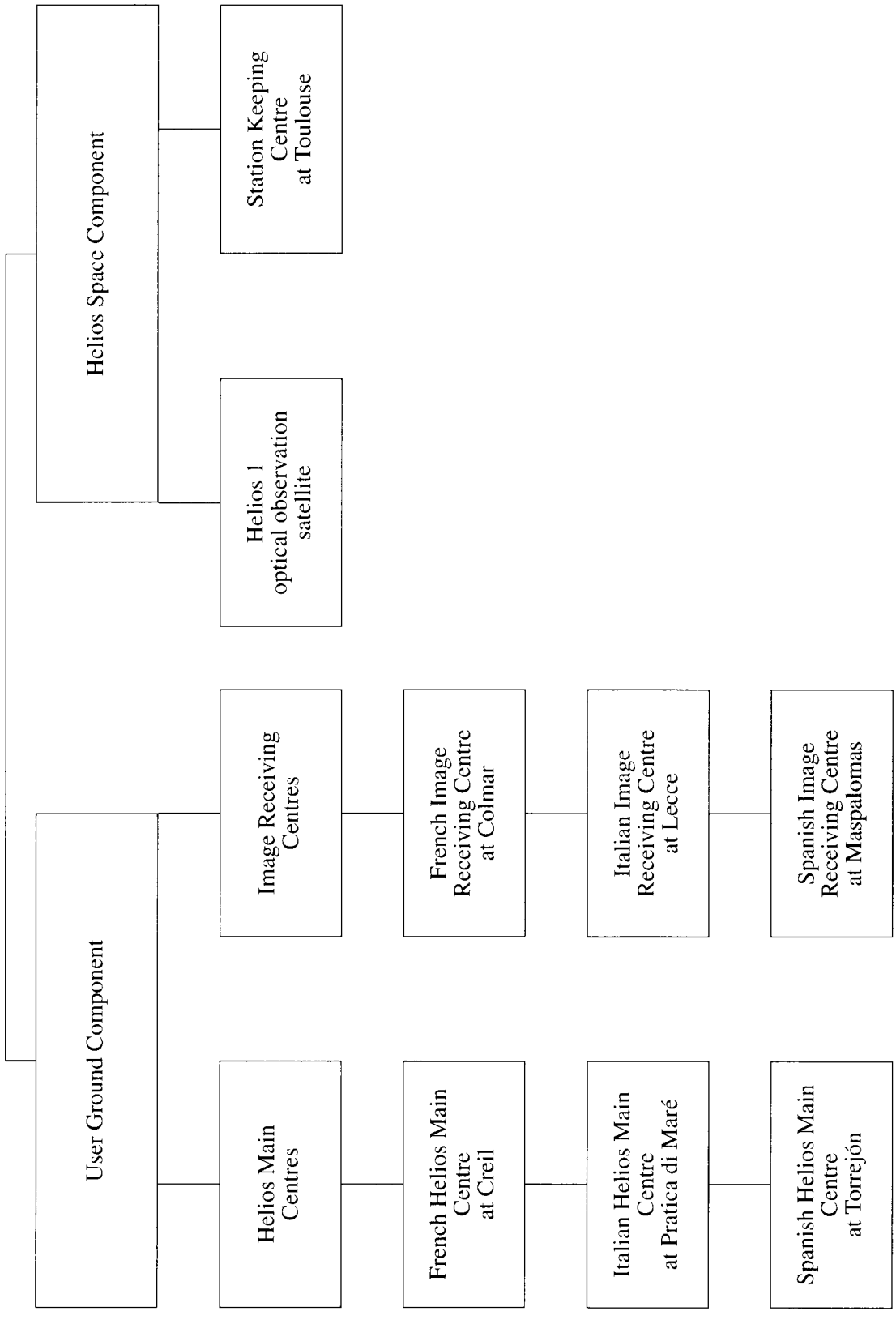
APPENDIX I

National and industrial responsibilities in the Helios 1 programme



APPENDIX II

The Helios 1 components



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